

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 22 JUL 2004

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Applicant's or agent's file reference CI 1596 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB 03/03318	International filing date (day/month/year) 01.08.2003	Priority date (day/month/year) 16.08.2002
International Patent Classification (IPC) or both national classification and IPC C22C1/04		
Applicant JOHNSON MATTHEY PUBLIC LIMITED COMPANY et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 01.03.2004	Date of completion of this report 21.07.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer González-Junquera, J Telephone No. +49 89 2399-7445 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/GB 03/03318**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-8 as originally filed

Claims, Numbers

1-7 as originally filed

8, 9 filed with telefax on 01.07.2004

Drawings, Sheets

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	1-9
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations

see separate sheet

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EXAMINATION REPORT - SEPARATE SHEET**

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Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.

1. Reference is made to the following documents:

D1: WO 96 23906 A

D2: ZALUSKI L ET AL: 'HYDROGEN ABSORPTION IN NANOCRYSTALLINE MG2NI FORMED BY MECHANICAL ALLOYING' JOURNAL OF ALLOYS AND COMPOUNDS, ELSEVIER SEQUOIA, LAUSANNE, CH, 1 February 1995 (1995-02-01), pages 245-249, ISSN: 0925-8388

2. The subject-matter of the invention is a process for the manufacture of Mg-based hydrogen storage media comprising comminuting a source of Mg under a reducing atmosphere until a required particle size is achieved, and adding a reducible PGM compound (Platinum Group Metal: Os, Ir, Pt, Ru, Rh, Pd) which is reduced during the milling and deposits on the surface of the Mg-based compound. Also claimed is the hydrogen storage material prepared by this process.

D1 (claims 9,10, examples 1,2) discloses a process which differs from the above in the following:

- (i) the milling is performed under an inert atmosphere (instead of under a reducing one), and
- (ii) Pd metal (instead of a reducible compound of it) is added to the comminuted Mg source.

The corresponding differences in the process of the application solve the problems associated with the handling of pyrophoric metallic Pd powders and with getting the final product charged with hydrogen.

D2 (page 295, right-hand column, from line 6 to the end of the column; page 248, right-hand column, last paragraph, to page 249, left-hand column, line 11) also discloses mechanical alloying of a Mg powder with metallic Pd under Ar atmosphere. The available prior art does not provide any hint that would lead the skilled person to perform the milling under a hydrogen atmosphere, or to use a Pd compound instead of Pd metal.

**INTERNATIONAL PRELIMINARY
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Hence, the subject-matter of claim 1, and its dependent claims 2-9, is novel and comprises an inventive step.

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8. A process according to any preceding claim, wherein the particles have an average particle size of less than 100µm.

5 9. A process according to any preceding claim, wherein the particles have an average crystallite size of less than 100nm.